TROY

TROY CORPORATION

January 31, 2006

201-16190

Mr. Oscar Hernandez, Director
Risk Assessment Division
U.S. EPA
HPV Chemicals Branch
Ariel Rios Building
Washington, D.C. 20460

RE: 2-(Hydroxymethylamino)ethanol
Robust Summaries and Test Plan
Chem RTK HPV Challenge Program
Response to EPA Comments dated November 28, 2005

Dear Mr. Hernandez:

Troy Chemical Company is responding to EPA's November 28, 2005 comments on the robust summaries for ethanol, 2-(hydroxymethylamino)- (CAS No. 34375-28-5, also known as 2-(hydroxymethylamino)ethanol) as submitted by Troy Corporation on February 21, 2005. EPA commented on this submission and reached a number of conclusions namely the need for the following information:

- Submittal of a test plan, which includes summary table of existing data, data gaps, and testing waivers.
- Physicochemical Properties such as boiling point, melting point, vapor pressure and partition coefficient.
- Data to address the biodegradation, photodegradation and fugacity endpoints.
- Data to address the reproductive toxicity endpoint
- Data to address the acute toxicity to algae endpoint.

Troy Chemical addresses each request for additional data separately below. (EPA's comments are included in *italicized text*, following by our indented response.) As described in greater detail, due to the rapid hydrolysis of 2-(hydroxymethylamino)ethanol to monoethanolamine and formaldehyde, there does not appear to be any justification to separately test the parent compound. Additionally, sufficient data are already available on the impact of the hydrolysis products.

General

The submitter needs to include a test plan in this submission such as a summary table of existing data, data gaps, and what testing is or is not proposed.

A test plan is provided below, based on our 2005 submission and the additional information contained in this document.

8 Vreeland Road • PO Box 955 • Florham Park, NJ 07932-0955
Tel 973-443-4200 Fax 973-443-0258

Table 1. Test Plan for Ethanol, 2-(hydroxymethylamino)- (CAS No. 34375-28-5)

	Endpoint	Information	OECD Study	*GLP*	Other Study	Estimation Method	Acceptable	New Testing Required
	Physical/Chemical Properties							
1	Melting point	Y	N	Y	N	Y	Y	N
2	Boiling point	Y	Y	Y	N	N	Y	N
3	Vapor pressure	Y	N	Y	Y	N	Y	N
4	Partition coefficient	Y	N	N	N	N	Y	N
5	Water solubility	Y	Y	Y	N	N	Y	N
	Environmental Fate							
6	Photodegradation	Y	N	N	N	N	Y	N
7	Stability in water	Y	N	Y	Y	N	Y	N
8	Transport between environmental compartments (fugacity)	Y	N	N	Y	N	Y	N
9	Biodegradation	Y	N	N	Y	N	Y	N
	Ecotoxicity							
10	Acute toxicity to fish	Y	N	Y	Y	N	Y	N
11	Toxicity to aquatic plants	Y	N	N	Y	N	Y	N
12	Acute toxicity to aquatic invertebrates	Y	N	Y	Y	N	Y	N
	Toxicity							
13	Acute toxicity	Y	ND	Y	Y	N	Y	N
14	Genetic toxicity in vivo (chromosomal aberrations)	Y	Y	Y	N	N	Y	N
15	Genetic toxicity in vitro (gene mutations)	Y	N	Y	Y	N	Y	N
16	Repeat dose toxicity	Y	N	Y	Y	N	Y	N
17	Reproductive toxicity	Y	N	N	Y	N	Y	N
18	Developmental toxicity/teratogenicity	Y	N	Y	Y	N	Y	N

Y = yes; N = no; ND = no data

Physicochemical Properties

Melting Point. The submitter concluded that testing for melting point is not needed because the chemical is a liquid at room temperature. However, for the purposes of the HPV Challenge Program, measured melting point data are needed unless the melting point of the substance is below 0°C.

2-(hydroxymethylamino)ethanol is a liquid at room temperature and does not exist in solid form. Due to its physical state (liquid) we ask that this data requirement be waived.

Boiling Point. The submitter provided an experimental boiling point of 110°C. This seems extremely low, as the closest homolog, diethanolamine, boils at 268.8 °C, while replacing the N-hydroxymethyl group with a much less polar methyl group (2-(methylamino)ethanol) results in a higher boiling point of 158 °C. The estimated boiling point of 213°C for the sponsored compound (EPIWIN) is consistent with these analog data. While the sample purity is given as nearly 99%, the submitter needs to discuss whether an impurity, or possibly decomposition, could explain the anomalous results. The identity of any known impurities should be stated. As a measurement pressure was not recorded, it is also possible that the value of 110°C was

determined at a reduced pressure. A new measurement on a purer sample or under more rigorous conditions may be necessary. Finally, the relevant OECD guideline is 103, not 102 as stated.

The boiling point of 2-(hydroxymethylamino)ethanol was determined according to OECD method 103 'Boiling Point/Boiling Range' (OPPTS Guideline No.: 830.7220). This method utilizes a capillary tube to determine the actual boiling point and an actual production lot was used for the determination of this value. The 110 °C value reported to EPA is an average of three samples. Values of the other samples tested were 115 °C, 110 °C and 105 °C. Since this product is formaldehyde adduct it exists in equilibrium with water. The product is manufactured by mixing monoethanolamine with paraformaldehyde under heat and the resulting product, 2-(hydroxymethylamino)ethanol and conditions such as pH and heat will reverse this equilibrium to monoethanolamine and formaldehyde. Various forms of formaldehyde will exist as an impurity in this product depending on the test conditions, all of which can affect the boiling point determination. This value was recorded at room temperature and pressure.

Vapor Pressure. The submitter provided calculated vapor pressure values of 1585 Pa (11.89 mm Hg) at 20 °C and 2116 Pa (15.87 mm Hg) at 25 °C, extrapolated from experimental values determined at a temperature range of 24.6 to 46.9 °C. These values are high in comparison with those of similar chemicals (e.g., diethanolamine, 2.80E-04 mm Hg); cf. comments above under Boiling Point. No sample purity was reported nor were impurities identified. The summary did not state whether atmospheric moisture, which could react with the sample to produce more volatile products, was excluded during sample handling. The submitter needs to discuss whether an impurity or some other factor could explain the anomalous results. The identity of any known impurities should be stated.

The determination of vapor pressure was conducted at a contract laboratory using an actual production lot of 2-(hydroxymethylamino)ethanol in accordance with OPPTS 830.7950. The study was conducted to meet U.S. EPA FIFRA regulatory guidelines required for a data call-in and reregistration. The methodology employed was the static method indicated in the test guidelines at the time the test was conducted. The vapor pressure was measured using four replicates based on thermodynamic equilibrium and pressure fluctuations. Based on this data the log of the pressure was plotted against the reciprocal of the absolute temperature. Vapor pressures at 20 and 25 °C were calculated from this curve. The replicate data for this study with the corresponding measured pressures were:

Temperature (°C)	Measured Vapor Pressure (Pa)
24.6	2082
30.8	2904
38.8	4453
46.9	6785

Based on the lot number, we have checked the purity of the test material and the value of 2-(hydroxymethylamino)ethanol was > 97.0%. Aside from the active ingredient, no other impurities were determined for this test article. Because of the test method and the fact that a vacuum was applied to the test article, it is unlikely that moisture played any role in the production of volatile by-products. Based on the results obtained it is highly unlikely that impurities could have affected these results. It is further significant to note that this study has been accepted by the Office of Pesticide Programs in support of this product (MRID #42198901).

Partition Coefficient. No data were provided for this endpoint. The submitter needs to provide an estimated value for log Kow or an explanation in the robust summary that log Kow values are not relevant because the chemical hydrolyzes rapidly.

Due to the chemistry of 2-(hydroxymethylamino)ethanol as a formaldehyde adduct, the measurement of this value can not be determined. The product is highly unstable and any analytical manipulation results in product hydrolysis and the reversal of the chemical reaction (namely formaldehyde and monoethanolamine). Rapid hydrolysis therefore makes the determination of this value impossible to obtain.

Environmental Fate

Biodegradation. The submitter did not provide ready biodegradation test data. However, biodegradation testing of 2-(hydroxymethylamino)ethanol itself is probably obviated by rapid hydrolysis. If this is the case, the submitter needs to provide biodegradation data for the hydrolysis products.

As indicated earlier, 2-(hydroxymethylamino)ethanol rapidly hydrolyzes at pHs of 5, 7 and 9. This study required for FIFRA re-registration was conducted at EPL Bio-Analytical Services, Inc. (Laboratory Project ID. 147S09). Based on this study, formaldehyde derived from 2-(hydroxymethylamino)ethanol was detected at the start of the study (time zero) indicating hydrolysis was complete in the aqueous solution. Extensive biodegradation information is available for formaldehyde and monoethanolamine. Extensive literature is available on formaldehyde and we attach data on monoethanolamine.

Photodegradation. The submitter did not provide photodegradation data. The submitter needs to provide estimated data for photodegradation or explain in the test plan and robust summary if data are not appropriate for this substance.

Based on the rapid hydrolysis of this compound, no additional testing is warranted to determine the effects of light (photodegradation) as it is not expected to impact hydrolysis.

Fugacity. The submitter did not provide fugacity values. The rapid hydrolysis of this substance suggests that fugacity modeling of 2-(hydroxymethylamino)ethanol will not be useful. Instead, the submitter needs to provide Level III fugacity model data on the hydrolysis products.

EPA suggests the fugacity modeling of 2-(hydroxymethylamino)ethanol will not be useful due to its rapid hydrolysis. Fugacity data is already available on the hydrolysis by-products monoethanolamine and formaldehyde. See attached OECD SIDS data on formaldehyde and attachments on monoethanolamine.

Health Effects

Reproductive Toxicity. The submitter did not provide data for this endpoint. Because this chemical hydrolyzes very rapidly to formaldehyde and ethanolamine, the submitter may provide available reproductive toxicity data on the hydrolysis products in lieu of conducting a reproductive toxicity study.

EPA is correct in the observation that this material hydrolyzes to formaldehyde and monoethanolamine and, rather than conducting an additional reproductive toxicity study reproductive toxicity data on these two components should be utilized to address this data requirement. See OECD SIDS data on formaldehyde and attachments on monoethanolamine.

Ecological Effects

EPA agrees with the submitter that there are adequate data for the fish and invertebrate acute toxicity endpoints for the purposes of the HPV Challenge Program. The submitter needs to provide acute toxicity data for algae using the sponsored chemical according to OECD TG 201 to address this endpoint or provide available data on its hydrolysis products.

Given the rapid hydrolysis of 2-(hydroxymethylamino)ethanol to monoethanolamine and formaldehyde, there does not appear to be any justification to separately test the parent compound. Additionally, sufficient data are already available on the impact of the hydrolysis products to algae. See OECD SIDS data on formaldehyde and attachments on monoethanolamine.

Thank you for providing us with the opportunity to comment and provide additional information on our product. Please contact me via phone or email should there be any additional questions regarding this compound (973-443-4200, X2249, krygsmaa@Troycorp.com)

Sincerely,

Adrian Krygsman
Director, Product Registration.

attachments